

PLACING AND RETRIEVING FIELD TLDs

Purpose This Meteorology and Air Quality Group (MAQ) procedure describes placing and retrieving thermoluminescent dosimeters (TLDs) during a normal quarterly field cycle of 90 days.

Scope This procedure applies to the TLD dosimeters used in the measurement of environmental levels of external direct penetrating radiation as part of the Direct Penetrating Radiation Monitoring Network (DPRNET) of MAQ.

In this procedure This procedure addresses the following major topics:

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Hazard Control Plan The hazard evaluation associated with this work is documented in Attachment 1: Initial risk = **low**. Residual risk = **low**. Work permits required: **none**. First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Signatures	Prepared by: Mike McNaughton, DPR Project Leader	Date: <u>12/19/2003</u>
	Approved by: Terry Morgan, QA Officer	Date: <u>12/19/2003</u>
	Work authorized by: Jean Dewart, MAQ Group Leader	Date: <u>12/19/2003</u>

12/19/03

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General information about this procedure

Attachments This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Hazard Control Plan	2
2	Specific Area Access Requirements	1

History of revision This table lists the revision history and effective dates of this procedure.

Revision	Date	Description of Changes
0	7/31/97	New document.
1	10/29/99	Removed steps for electrets, updated steps for TLDs.
2	2/20/01	Corrections and additions to HCP, updated steps to reflect new black badge TLDs.
3	12/22/03	Revised to reflect changes in collection assignments.

Who requires training to this procedure? The following personnel require training before implementing this procedure:

- Any person required to perform the field change-out process

Training method The training method for this procedure is **on-the-job** training by a previously trained individual and is documented in accordance with the procedure for training (MAQ-024).

Prerequisites In addition to training to this procedure, the following training is also required prior to performing this procedure:

- Site-specific training for all areas to be visited

Periodically review the field safety information in the All Employee Handbook (see MAQ-032).

General information, continued

Definitions specific to this procedure

Change-out: the process of placing and removing TLDs or reading other monitoring devices while they are located in the field of measurement.

References

The following documents are referenced in this procedure:

- MAQ-024, "Personnel Training"
 - MAQ-032, "Orienting New Employees"
 - MAQ-250, "Obtaining the Environmental Dose from the Model 8823 Dosimeter"
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Note

Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Preparations for change-out

Description of operation Before TLDs or other monitoring devices can be placed or retrieved from the field, several processes will need to be completed. There may be on-site LANL personnel and off-site personnel that need to be informed, equipment to gather, irradiations to be performed at another LANL facility, and other requirements to be met. These processes should be completed within a week prior to beginning the field change-out.

Performing work safely **DO NOT perform work under conditions you consider unsafe.** Before beginning work described in this procedure, review safety needs and requirements, identify hazards, and develop hazard mitigation measures, as described in Attachment 1. Be aware that facility configurations and hazards may change between visits.

Equipment needed to change TLDs In general, for the normal TLDs used for the environmental networks, collect the following equipment:

- Several large (10 x 12”) zip-lock bags to hold new and old TLDs, and to separate the various field-fade dosimeters from the regular ones.
- Two small coolers, one for the new TLDs (to be deployed) and one for the old TLDs (retrieved from the field).
- Permanent (waterproof) marker (to mark bags as needed).
- Extra steel rings or other devices that are used to hold the TLDs (to replace any broken or missing items).
- Extra weatherproof and sun-proof containers to protect the TLDs in the field.
- Portable barcode reader.
- Field note book, list of sites, area maps as needed, and pens.
- Spare barcoded location ID # tags (to replace unreadable or missing tags) determine which need replacement by reviewing last quarter’s field logs.
- Dosimeters: one per station, plus 80 QA dosimeters as described in procedure RRES-MAQ-250 page 11 of 18.
- Cellular phone w/ backup battery for remote areas and out-of-county trips; pager for entering security areas (where cell phone batteries must be removed.)

Preparations for change-out, continued

Placing TLDs in the field

There is no perfect answer on how to place a TLD in the field. The main problems to consider are: unauthorized removal (either by teenage boys or by well-meaning LANL employees), and the effects of the weather.

- Prolonged moisture causes the TLD material to deteriorate.
- prolonged sunlight causes high readings.
- prolonged heat causes the signal to fade.
- wind damages or dislodges dosimeters.

Whenever possible:

- place TLDs within secure areas.
 - protect them from heat, sun, and prolonged moisture.
 - secure the dosimeters (e.g., with a binder cloth) so they do not flap in the wind.
 - place the dosimeters approximately 1 meter (plus or minus 20%) above the ground; this is about waist height.
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Categories of dosimeters

The dosimeters are divided into the following categories:

- F00: regular field dosimeters; one is placed at each station.
 - F01,2,3: QA dosimeters; in addition to F00, 3 others (total of 4) are placed at 5 QA sites.
 - FD0,1,2,3: field fade dosimeters; these are exposed to 300 mrem *before* deployment, then 4 are placed at each of the 5 QA sites.
 - EA0,1,2,3: "Exposed After" dosimeters; 4 of these are placed at each QA site; then they are exposed to 300 mrem *after* they have been collected from the field.
 - Vault: at least 20 dosimeters are stored in the vault for (approximately) the same number of days that the others are in the field.
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Steps to prepare for change-out

Perform the following steps to make the necessary preparations prior to beginning the field change-out:

Step	Action
1	Ensure all personnel performing or assisting in the changeout have the required training. For unescorted access to some areas within LANL, personnel may need to be Q-cleared, or have GET or Radiation Worker training. In addition, site-specific training is required at TA-53 (LANSCE), at TA-15 and at TA-54, Area-G. See Attachment 2 for specifics.

Steps continued on next page.

Preparations for change-out, continued

Step	Action
2	Arrange with the HSR-4 Calibration Facility to (a) assemble 180 to 200 dosimeters, and (b) irradiate 20 field-fade (FD) dosimeters with 300 mrem. This will normally be done one week prior to starting the change-out, but will depend upon HSR-4's schedule. It is prudent to inform them as early as possible, and schedule a date.
3	After they have been irradiated, place the 20 FD dosimeters in a clearly-marked Ziploc bag; 4 of these will be placed at each of the 5 QA locations.
4	Inform the project leader or alternate and other relevant group personnel at least one week prior to your desire to begin the change-out; ask about any special instructions. For certain technical areas, site personnel will need to be informed in order to gain access. See Attachment 2 for specific contact personnel.
5	During the same week, coordinate with the group office for the use of an appropriate vehicle, as needed (perhaps 4WD for winter or muddy conditions, or van to carry any accompanying personnel, etc.).

Planning field change-out

Description of operation	To start the field change-out requires some planning. The steps described below are only a recommended sequence of actions.
Working alone policy	The group prefers two people to travel together to collect AIRNET and DPRNET samples. However, it is acceptable for one person to collect samples. <u>In either case</u> , ensure you have a working cellular phone or radio in the vehicle, and a pager if entering security areas (where cell phone batteries must be removed).
Working in a facility	Work control in a laboratory facility is the responsibility of the Facility Manager. Routine sample collection activities may require facility management approval before beginning work described in this procedure; contact the facility manager before any other work, if so required.
Working at Pueblos	<p>At Pueblos, work control is the responsibility of the Pueblo authorities. Complete the following check-in requirements.</p> <ul style="list-style-type: none">• Check in at the Pueblo's Environmental Office or call ahead of the trip to make arrangements for access permission or escort.
Maintaining physical control of samples	<p>A sample is physical evidence collected from a facility or the environment. All samples must be physically controlled. A sample is considered in control if it is one of the following:</p> <ul style="list-style-type: none">• In one's physical possession.• In one's view after being in one's physical possession.• In one's physical possession and then locked up so that no one can tamper with it.
Dosimeter locations	The DPR project leader and lead technician maintain a list of all dosimeters and a description of their locations. The location names are maintained in the DPRNET database "Site Loc" table. Refer to this information when planning the route as described in step 1 below.

Planning field change-out, continued

Steps to begin the change-out To begin the change-out, follow the recommended steps below:

Step	Action
1	Refer to area maps and Attachment 2 to determine the route needed to visit the maximum number of stations within the desired time frame.
2	Choose 5 locations for QC dosimeters. A good location should <ul style="list-style-type: none">• be secure from theft.• have a low expected dose rate.• not have a Lucite block. (For example, suitable locations are DPRNET stations 38, 58, 72, 75, 76, 88, 89, 91, 107.) These locations will receive 12 QC dosimeters (steps 2-4 on page 11 of MAQ-250) instead of the usual 1.
3	After determining the routes needed, ensure your vehicle has enough fuel for the day.
4	Begin change-out by driving to first location.

Placing and retrieving TLDs in the field

Description of operation Travel to each location and perform the steps below.

Steps to place and retrieve dosimeters Perform the following steps to place the new TLDs in the field:

Step	Action
1	At a TLD location, take the new TLD(s) for the quarter being issued from the storage cooler. Ensure the field fade dosimeters are placed at the appropriate locations.
2	Using the field barcode reader, scan the barcode tag indicating the field location number. If the site's ID number is missing or unreadable, manually enter its number and make a note that the tag needs replacement. Replace any unreadable tags that were noted from the previous changeout.
3	Scan the barcode tag of the TLD(s) being retrieved. Scan the barcode tag of the TLD being deployed. At the locations that also require field-fade TLDs, also scan their barcode tag ID numbers. Record the data on the hard copy site list for a quick reference of which sites have been completed.
4	If there are any anomalies in the ID numbers or if the TLD(s) are missing, etc., note this in the "Comments" section on the barcode reader.
5	Keep the <i>new</i> and <i>old</i> dosimeters in separate coolers. It is therefore most important that the TLDs be kept separate and that strict control is maintained in the retrieval process. This is even more important in cases where the ID number is unreadable. About half of all tags are marked with a different color of badge label. At any one time, these marked dosimeters are either being <u>placed</u> or <u>retrieved</u> . Use this marking to help keep the dosimeters separated.
6	If a TLD's ID number is unreadable when retrieved, note this in the comments section. Log a note in the field logbook as to location and all relevant information to assist in assigning the correct ID when returning from the field later on. If this is not done, it will be impossible to know the ID number when it comes time to read out the TLD in the lab.

Steps continued on next page.

Placing and retrieving TLDs in the field, continued

Step	Action
7	At each QA location, place all 12 dosimeters in a clearly-marked Ziploc bag for special handling at the lab.
8	When all TLDs are placed and retrieved properly, drive to next location and repeat steps 1 through 7.
9	At the end of the collection period, leave the remaining unused new dosimeters and the old TLDs retrieved from the field in their coolers and store them at TA-54, Bldg 1001. Each day, repeat all above steps until the changeout is complete.
10	At the end of the collection process, forward the field notes and barcode-reader data to the individual using the database. If field data were collected electronically on a bar code reader or similar equipment, follow the equipment instructions to upload the data file onto a computer and then forward the file (the "issue/pickup" data) to the individual using the database.

Steps to process the dosimeters

Perform the following steps to deliver the dosimeters to HSR-4 for processing after they have been retrieved from the field:

Step	Action
1	Take the Ziploc bag of <i>old</i> dosimeters from the vault and place them with the dosimeters retrieved from the field.
2	Place all the remaining <i>new</i> dosimeters in a Ziploc bag, marked with today's date, and place them in the vault.
3	Take each of the 5 Ziploc bags, each containing 12 dosimeters collected from the QC stations, and sort them into two piles: <ul style="list-style-type: none"> the 4 field fades already exposed to 300 mrem. the 8 other dosimeters. Designate 4 of the "other" dosimeters as EA dosimeters (to be "exposed after"), place them in a marked Ziploc bag, and keep them separate.
4	Deliver two bundles of old dosimeters to the HSR-4 dosimetry lab at TA-3. <ul style="list-style-type: none"> Deliver all dosimeters except the EA dosimeters to be processed in the standard way. Deliver the EA dosimeters to the lead technician with written instructions to irradiate with 300 mrem before processing.

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be submitted **quarterly** as records to the records coordinator. Because references are made throughout the year to the quarterly results, a copy of the quarterly reports or records may be retained by the individual assigned to perform the dose calculations until they are released in the ESR.

- Field Data sheets and/or barcode reader downloaded ASCII text files

HAZARD CONTROL PLAN

1. The work to be performed is described in this procedure. Procedure title:
“Placing and Retrieving Field TLDs”

2. Describe potential hazards associated with the work (use continuation page if needed).

Slips and falls
Tripping
Animal Injuries (snakes, mountain lions, etc.,)
Heat and cold
Weather (lightning, heat stress, cold stress)
High Explosives testing (TA-15, TA-16)
Restricted Areas (LANSCE, TA-54- Area-G).

3. For each hazard, list the likelihood and severity, and the resulting initial risk level (before any work controls are applied, as determined according to LIR300-00-01.0, section 7.2)

Slips and falls -- Catastrophic/Remote = Low
Tripping -- Moderate/Occasional = Low
Animal Encounters -- Critical/Remote = Minimal
Lightning -- Catastrophic/Remote = Low
Heat stress -- Critical/Remote = Minimal
Cold stress -- Critical/Remote = Minimal
Entry into High Explosives testing Areas -- Critical/Remote = Minimal (existing controls are stringent and not easily bypassed)
Entry into restricted areas – Occasional / moderate = low

Overall *initial* risk: ☐ Minimal ☒ Low ☐ Medium ☐ High

4. Applicable Laboratory, facility, or activity operational requirements directly related to the work:

☐ None ☒ List: Work Permits required? ☒ No ☐ List:

LIR-402-706-01 “Personnel Dosimetry”

LIR-402-718-01 “Radiological Training”

Access Control Requirements for TA-15, TA-16, TA-49, TA-53, TA-54

HAZARD CONTROL PLAN, continued

5. Describe how the hazards listed above will be mitigated (e.g., safety equipment, administrative controls, etc.):

Falls, tripping – Do not travel near canyon edges.

Animal Injuries -- Employee orientation includes training and awareness of this hazard.

Lightning -- Employee orientation includes training and awareness of this hazard.

Heat stress -- Employee orientation includes training and awareness of this hazard; safety equipment includes drinking water bottles and hats/caps.

Cold stress -- Employee orientation includes training and awareness of this hazard; safety equipment includes winter clothing and footwear available from the group by request.

Entry into high explosives testing areas – Explosives areas are posted and access controls are not easily bypassed. Employee orientation includes awareness of this hazard.

Entry into restricted areas – restricted areas are posted and site-specific training includes awareness of this hazard.

6. Knowledge, skills, abilities, and training necessary to safely perform this work (check one or both):



Group-level orientation (per MAQ-032) and training to this procedure.



Other → See training prerequisites on procedure page 2. Any additional describe here:

7. Any wastes and/or residual materials? (check one) ☒ None ☐ List:

8. Considering the administrative and engineering controls to be used, the *residual* risk level (as determined according to LIR300-00-01.0, section 7.3.3) is (check one):



Minimal



Low



Medium (requires approval by Division Director)

9. Emergency actions to take in event of control failures or abnormal operation (check one):



None



List:

All animal injuries, lightning, falls/tripping accidents, heat/cold stress, and injuries from explosives-- see that affected person has first aid applied and then transport to ESH-2 or local hospital as soon as possible. If alone and injured, call for assistance using cellular phone, as possible.

Signature of preparer of this HCP: This HCP was prepared by a knowledgeable individual and reviewed in accordance with requirements in LIR 300-00-01 and LIR 300-00-02.

Preparer(s) signature(s)

Name(s) (print)

/Position

Date

Signature by group leader on procedure title page signifies authorization to perform work for personnel properly trained to this procedure. This authorization will be renewed annually and documented in MAQ records.

Controlled copies are considered authorized. Work will be performed to controlled copies only. This plan and procedure will be revised according to MAQ-022 and distributed according to MAQ-030.

ATTACHMENT 2

SPECIFIC AREA ACCESS REQUIREMENTS

TA	Site	Site Access Requirements	Site-specific Training Requirements	Principal Contact(s)	Phone/Pager
15	DX-Div: operable units within FMU- 67	“Q” clearance required / “L” clearance if escorted by “Q”	ES&H paperwork on file: check in at Access Control for Briefing/Rad-Worker I.	Janette Lujan or Rita Galvan-Prada	7-0489 or also thru DX-4 Radio Net (if have access to radios)
33	TA-33	Must have keys to gate or FMU-75 escort.	Rad-Worker I	John Jennings, TA- 35, Bldg2, Room B105	<u>7-0370</u> or 7-6535
53	LANSCCE	LANL or Contractor’s Badge	Rad-Worker I & LANSCCE Facility- specific training (CBT-course #9693) for unescorted access	Training Coordinator: Jamie McDonald MAQ: Bob Keys (for keys/access to Controlled Areas)	Training office LANSCCE: 5-6256 Bob Keys: 5-1678
54	Active Material Disposal Area “G”	LANL or contractor’s badge	GET/ Rad-Worker II/ HAZWOPER for TSD facilities/ Site Orientation training & video; entry on record in site database system.	Check in at the Main TA-54-Area-G & L Access Control Office for initial entry to site; badge entered into database system; drive to Area-G Access Control Office and badge in/sign vehicle in.	